AMENDMENTS TO THE CLAIMS:

This listing of claims replaces all prior versions, and listings, of claims in this application:

1. (Currently amended) A method of configuring and tracking an array of probes comprising;

generating at least two independently movable optical traps within a vessel;

providing at least two probes within the vessel;

selecting at least two of the probes for inclusion in an array of probes contained within the optical traps based on predetermined binding and reactivity characteristics of the probes;

trapping each of the selected probes having said predetermined binding and reactivity characteristics with a corresponding one of the optical traps to configure the array of probes contained within the optical traps; and,

tracking ~~the~~ a position of at least one of the trapped probes in the array by computerized monitoring of the position of the optical trap which contains it.

2.-12. (Canceled)

13. (Currently amended) The method of claim 1, wherein the trapped probe is one of a chemical compound or a biological material.

14.-17. (Canceled)

18. (Currently amended) The method of claim 1 wherein the trapped probe is at least one of an oligonucleotide, a polynucleotide, a protein, a polysaccharide, a ligand, a cell, an antibody, an antigen, a cellular organelle, a lipid, a blastomere, an aggregations of cells, a microorganism, a peptide, cDNA, RNA or combinations thereof.

19.-56. (Canceled)

57. (Currently amended) A method of assaying biological material comprising:

generating at least two independently movable optical traps within a vessel;

providing a fluid media in the vessel;

providing at least two probes for biological materials within the fluid media;

selecting at least two of the probes for inclusion in an array based on predetermined binding and reactivity characteristics of the probes;

trapping each of the selected probes having said predetermined binding and reactivity characteristics with a corresponding one of the optical traps;

introducing into the vessel at least one target comprised of a biological material; and,

determining the reaction or lack thereof, of each of the trapped probes with each of the targets;

wherein the probes which react with the targets are segregated from the remaining probes.

58.-60. (Canceled)

61. (Previously presented) The method of claim 57, wherein the trapped probe is at least one of an oligonucleotide, a polynucleotide, a protein, a polysaccharide, a ligand, a cell, an antibody, an antigen, a cellular organelle, a lipid, a blastomere, an aggregations of cells, a microorganism, a peptide, cDNA, RNA at combinations thereof.

62.-86. (Canceled)

87. (Currently amended) A mode of configuring an array of probes comprising:

generating at least two independently movable optical traps within a vessel;

providing at least two probes within the vessel; and

configuring an array of at least two probes by selecting each probe based on predetermined binding and reactivity characteristics of the probes, with a corresponding one of the optical traps;

wherein said array is modifiable by removing or adding at least one probe in said array; and

tracking a position of at least one of the trapped probes in the array by computerized monitoring of the position of the optical trap which contains it.

88. (Currently amended) A method of configuring and reconfiguring an array of probes comprising:

directing a focused beam of light at a phase patterning optical element to form a plurality of beamlets emanating from the phase patterning optical element;

directing the plurality of beamlets at the back aperture of a focusing lens to pass the beamlets through the focusing lens and converge the beamlets emanating from the focusing lens to generate independently movable optical traps within a vessel;

providing a plurality of probes within the vessel;

selecting at least two of the probes for inclusion in the array of probes contained within the optical traps based on predetermined binding and reactivity characteristics of the probes;

trapping each of the selected probes with said predetermined binding and reactivity characteristics, with a corresponding one of the optical traps to configure the array of probes contained within the optical traps;

altering a position of at least one of the probes contained within the array by moving the optical trap containing the probe to reconfigure the array of probes contained within the optical traps; and

tracking a position of at least one of the trapped probes in the array by computerized monitoring of the position of the optical trap which contains it.

89.-102. (Canceled)

103. (Withdrawn) A system for forming and tracking optical traps containing probes comprising:

a light source for producing a focused beam of light;

a substantially transparent vessel;

an image illumination source for producing a beam of light illuminating contents of the vessel;

a beam splitter for directing;

a phase patterning optical element for receiving the focused beam of light originating from the lift source and diffracting it into at least two beamlets, the phase patterning optical element having a surface for directing each of the beamlets at a back aperture of a focusing lens, the surface being alterable to change the phase profile and/or orientation of at least one of the beamlets;

the focusing lens for converging each of the beamlets to form optical traps for containing probes; and

a monitor for receiving the beam of light illuminating contents of the vessel and tracking the movement and contents of at least one optical trap.

104.-111. (Canceled)

112. (Previously amended) The method of claim 1, wherein the movement of the trapped probes are tracked based on pre-determined movement of each optical trap caused by encoding the phase patterning optical element.

113.-129. (Canceled)

130. (Withdrawn/Currently Amended) The system of claim ~~127~~1 wherein the phase patterning optical element is selected from the group consisting of gratings, holograms, stencils, light shaping holographic filters, lenses, mirrors, prisms, or waveplates.

131.-148. (Canceled)

149. (Withdrawn) An apparatus to form an army of optical traps comprising:

a light source for producing a focused beam of light;

a focusing lens having a top and bottom, the bottom forming a back aperture;

a phase patterning optical element for receiving the focused beam of light and diffracting it into at least two beamlets, the phase patterning optical element having a surface for directing each of the beamlets at the back aperture of the focussing lens;

a first channel having first and second ends, the first end in communication with the phase patterning optical element;

a second light channel having first and second ends, the first end intersecting the second end of the first light channel;

a third light channel having first and second ends, the first end in communication with the second end of the second light channel;

a first mirror reflecting the beamlets emanating from the phase patterning optical element through the first light channel;

a first set of transfer optics disposed within the first light channel, aligned to receive the beamlets reflected by the first mirror;

a second set of transfer optics disposed within the first light channel, aligned to receive the beamlets passing through the first set of transfer lenses;

a second mirror positioned at the intersection of the first light channel and the second light channel, aligned to reflect beamlets passing through the second set of transfer optics through the third light channel; and

a third mirror disposed within the third light channel for reflecting beamlets passing through the third light channel to the back aperture of the focusing lens and forming an array of optical traps.

150.-157. (Canceled)

158. (New) The method of claim 57, further comprising tracking the position of at least one of the trapped probes by monitoring the position of the optical trap which contains it.

159. (New) The method of claim 57, wherein the trapped probe is comprised of one of a biological material or a chemical compound.

160. (New) The method of claim 57, further comprising producing an optical data stream of data corresponding to the identity and position of at least one of the optical traps.

161. (New) The method of claim 57, further comprising altering a position of at least one trapped probe in the array by moving the optical trap containing the probe.

162. (New) The method of claim 57, wherein each optical trap is movable independently.

163. (New) The method of claim 57, wherein the movement of each optical trap is controlled by a computer.

164. (New) The method of claim 160, further comprising receiving the optical data-stream with a computer.

165. (New) The method of claim 164, further comprising analyzing the optical data stream with the computer.

166. (New) The method of claim 165, further comprising using the computer to direct the movement of one or more optical traps based on the analysis of the optical data stream.

167. (New) The method of claim 166, further comprising converting the optical data-stream to a video signal.

168. (New) The method of claim 167, further comprising receiving the video signal with a computer.

169. (New) The method of claim 167, further comprising analyzing the video signal with the computer.

170. (New) The method of claim 169, further comprising using the computer to direct the movement of one or more optical traps based on the analysis of the video signal.

171. (New) The method of claim 170, wherein the video signal is used to produce an image.

172. (New) The method of claim 171, further comprising viewing the image and directing the movement of one or more of the optical traps based on the viewing of the image.

173. (New) The method of claim 160, wherein the data is spectroscopic data.

174. (New) The method of claim 173, further comprising using a computer to direct the movement of one or more optical traps based on an analysis of the spectroscopic data.

175. (New) The method of claim 57, wherein the optical traps are formed of two or more of optical tweezers, optical vortices, optical bottles, optical rotators, and light cages.

176. (New) The method of claim 57, wherein at least two of the probes have binding or reactivity characteristics that differ from one another and at least one of the probes is selected by segregating the probe based on its different binding or reactivity characteristic by moving the probe to a predetermined location within the vessel and using the location of the segregated probe to select the probe.

177. (New) The method of claim 176, wherein at least one of the probes is one of bound to a substrate or unbound to a substrate.

178. (New) The method of claim 177, wherein all the substrate bound probes having the same binding or reactivity characteristic are labeled with the same markers.

179. (New) The method of claim 178, wherein at least one of the markers is a wavelength specific dye.

180. (New) The method of claim 179, wherein at least one of the substrate bound probes is selected by measuring the spectral response of the wavelength specific dye and using the spectral measurement to select the at least one probe.

181. (New) The method of claim 176, wherein the predetermined location is one of a physical sub-cell or an optical sub-cell.

182. (New) The method of claim 177, wherein at least one of the probes is bound to a substrate labeled with a wavelength specific marker and the at least one bound probe is selected by spectroscopically measuring the marker and using the spectroscopic measurement to select the at least one probe.

183. (New) The method of claim 57, further comprising moving at least one of the trapped probes by transferring the probe from one optical trap to another.

184. (New) The method of claim 57, wherein the probes are all directly trapped by the optical trap.

185. (New) The method of claim 57, wherein at least some probes are bound to a substrate and at least some probes are unbound to substrate.

186. (New) A method in accordance with claim 57, further comprising moving at least three of the trapped probes by transferring the probe from a first set of optical traps to a second set of optical traps.

187. (New) The method of claim 57, wherein the phase patterning optical element has a static surface having two or more discrete regions and the position of at least one optical trap is altered by changing the discrete region of the static surface to which the beam of light is directed.

188. (New) The method of claim 57, wherein the phase patterning optical element is dynamic and varying the phase patterning optical element alters the position of the at least one optical trap.

189. (New) The method of claim 57, wherein the phase patterning optical element is dynamic and varying the phase patterning optical element changes the form of at least one of the optical traps to an optical tweezer, an optical vortex, an optical bottle, an optical rotator, or a light cage.

190. (New) The method of claim 57, wherein the movement of at least one optical trap is selected from one or more of the group consisting of rotation in a fixed position, rotation in a non- fixed position, movement in two dimension, and movement in three dimensions.

191. (New) The method of claim 158, further comprising moving the optical trap containing the tracked probe by changing the surface of the phase patterning optical element.

192. (New) The method of claim 176, wherein the probes are segregated using movement by optical traps, flow channels or micro-capillaries.

193. (New) The method of claim 88, wherein the phase patterning optical element has a static surface.

194. (New) The method of claim 193, wherein the static surface is comprised of two or more discrete regions.

195. (New) The method of claim 194, wherein the position of at least one of the probes contained within the optical traps is altered by changing the discrete region of the static surface to which the beam of light is directed.

196. (New) The method of claim 195, wherein the static surface is substantially continuously varying.

197. (New) The method of claim 194, wherein the position of the at least one optical trap is altered by changing the region of the static surface to which the beam of light is directed.

198. (New) The method of claim 88, wherein the beam altering optical element is a grating, a hologram, a stencil, a light shaping holographic filter, a lens, a mirror, a prism, or a waveplate.

199. (New) The method of claim 194, wherein each discrete region is a grating, a hologram, a stencil, a light shaping holographic filter, a lens, a mirror, a prism, or a waveplate.

200. (New) The method of claim 88, wherein the phase patterning optical element is dynamic.

201. (New) The method of claim 200, wherein the position of the at least one of the probes contained in the optical traps is altered by varying the dynamic phase patterning optical element.

202. (New) The method of claim 200, wherein the form of at least one of the optical traps is changed by varying the dynamic phase patterning optical element.

203. (New) The method of claim 88, wherein the phase patterning optical element has a discrete static surface, and wherein a form of at least one of the optical traps is changed by moving the discrete static surface.

204. (New) The method of claim 202, wherein the varying of the dynamic phase patterning optical element is a change in a hologram encoded on its surface.

205. (New) The method of claim 88, wherein the probes are segregated using movement by optical traps, flow channels or micro-capillaries.

206. (New) The method of claim 88, wherein the form of the changed optical trap is selected from the group consisting of optical tweezers, optical vortices, optical bottles, optical rotators, and light cages.